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Sex offending and social anxiety: a systematic review

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Title: Sex offending and social anxiety: A systematic review.

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Abstract

For innovative up-to-date research in an area to be developed, it is important to systematically, and critically evaluate the previous research. Sexual violence against children is one of the most serious crimes, with detrimental psychological and physical consequences on the victims. Contemporary theories of the development and maintenance of sexual offending against children incorporate intimacy deficits and social skills deficits. However, there is a dearth of research addressing the clinical needs of males who commit sexual offences against children. This systematic review critically evaluates previous research on the association between social anxiety and sexual offending against children. To identify studies relevant databases were searched and selected journals hand searched. Studies were evaluated for eligibility, data extracted and study quality assessed, with a second rater to establish inter-rater reliability. The results indicate eight of the eighteen studies reviewed reported an inconclusive statistical association with child sex offenders and social anxiety. Of the remaining ten studies, one study had a strong statistical association, four studies had a moderate statistical association and five studies were weak statistical association. Overall, the findings indicate methodological inconsistencies and lack of definitional clarity of subgroups of sex offenders, therefore comparison between studies is challenging. Further research in this area with definitional clarity of subgroups is required to inform evidence-based practice for this offender group.

Keywords: sex offenders, child sexual abuse, paraphilia, social anxiety and social phobia.

1. Introduction

Sexual violence and abuse is defined as forcing, or attempting to force any behavior of a sexual nature, which is unwanted by the other person, including cases where he/she does not consent or understand (Scottish Crime and Justice Survey, 2011). Within society, these are considered to be some of the most serious and damaging offences, particularly when committed against children, which can have significant consequences for the physical, emotional and psychological well-being of the victims (Pérez-Fuentes, Olfson, Villegas, Morcillo, Wang & Blanco, 2013). Estimations of prevalence are predominantly based on official criminal statistics for all sexual offences and are unlikely to accurately reflect the prevalence of sexual offences against children, as these offences are vastly undetected and unreported (Lussier & Cale, 2013). Victimization surveys in the UK indicate an overall decline of 12.5% in sexual offences since 2004, with a slight increase of 1% between 2009/10 to 2011/12 (British Crime Survey, 2011/12), which may be due to recent media attention and campaigns to raise awareness of child sexual abuse (CSA). However, victim surveys are also likely to be an underestimation of the prevalence of sex offences (Lussier & Cale, 2013).

There are concerns over the prevalence of CSA and our ability to predict which people are likely to offend. Understanding why individuals sexually offend has been a driving force for research in the sex offender literature in order to reduce risk and improve clinical interventions. However, sex offender literature almost exclusively focuses on sexual recidivism (i.e. those factors that contribute to repeat offending post-conviction) (Lussier & Davis, 2011), rather than those factors that might be associated with such offending (directly or indirectly). Due to concerns over dangerousness, researchers are driven by public and political demand to understand contact child sex

offenders (CCSO) and the factors that are associated with risk and risk management. Thornton (2002) identifies four areas of dynamic risk factors: socio-affective functioning, sexual interests, distorted attitudes, and self-management, this review focuses on socio-affective functioning.

1.1. Theories of sexual offending

Numerous theories have been proposed to identify underlying factors leading to offending by CCSOs (e.g. Finkelhor, 1984; Hall & Hirshman, 1991; Marshall & Barbaree, 1990; Ward & Hudson, 1998; Ward & Siegert, 2002). Theories of sexual offending are multifactorial, involving biological, cultural and developmental factors (Ward, Polaschek & Beech, 2006). These important theoretical developments include both specific single factor theories, as well more complex integrated models with multiple factors (Thakker & Ward, 2012). Social, interpersonal and intimacy deficits have been highlighted in theories of sexual offending as a cluster of common characteristics among some sex offenders, which results in difficulties establishing or maintaining relationships (Ward, Polaschek & Beech, 2006).

1.2. Psychiatric disorders

Axis I Disorders in this population have received limited research attention. It is speculated that an increased understanding of these factors within the child sex offender population could serve several functions: assist risk assessment, influence appropriate treatment and increase understanding of individuals' behaviors and motivations. Anxiety disorders are a group of psychiatric diagnoses that may prove relevant. Social Anxiety (SA) can lead to social isolation and lack of intimate relations with adults.

A previous review considers comorbidity of psychiatric Axis I disorders in sex offenders with a pharmacological treatment focus, report that pharmacological treatments for ameliorating comorbid Axis I may reduce sexual impulsivity (Kafka, 2012). The studies reviewed by Kafka (2012) were diverse in sample groups, diagnostic methodologies and settings, with no indication of the quality of the primary research. Not all studies examined the same broad range of Axis I disorders or focused on one specific disorder (e.g. exclusively SA). Hence, although SA is commented on for some of the studies, there is a need for systematic exploration. There is also a need to know more about psychological treatments, considering that psychological interventions for SA for non-offenders are recommended in National Institute of Health and Care Excellence guidelines (NICE; 2013).

1.2.1. Social Anxiety

Social anxiety disorder (SAD) is defined by “a marked and persistent fear of social or performance situations in which embarrassment may occur” (pp.450) (American Psychiatric Association; APA, 2000). A National Comorbidity Survey-Replication study estimated in the general population, the twelve-month and lifetime prevalence, of social anxiety, to be 7.1% and 12.1% respectively (Kessler et al., 2005). Heimberg, Brozovich and Rapee (2010) described how the individual’s perception of potential negative evaluation or rejection by others, results in an intense fear and avoidance of social situations. Clark and Wells’ model (1995) describe a shift to an internal focus of attention: internal information is used to infer how one appears to others and safety behaviors maintain SA. Common features of SA include fear of social interaction, fear of attracting attention, hypersensitivity to criticism, fear of negative evaluation or/and rejection from others, low self-esteem and lack of assertiveness (APA, 2000).

1.2.2. Comorbidity social anxiety and sex offending

Harsch (2006) suggests it is not only sex offenders in psychiatric settings who exhibit mental disorders, but also violent offenders and sex offenders in other settings such as prison. Yet, studies are largely correlational, and therefore not indicative of a causal relationship between mental disorder and sexual offending. Nunes, McPhail and Babchishin's (2012) meta-analysis found evidence for social anxiety among sex offenders. It is possible that the process of being convicted of a sex offence may promote the development of a psychiatric disorder through the impact of society's disdain and judgment, isolation from family and friends, being the lowest in the hierarchy of prison populations and often having been the victim of abuse (Marshall, Marshall, Serran & O'Brien, 2009). Conviction may be a traumatic experience resulting in guilt, shame and social rejection (Hunter & Figueredo, 2000).

A recent cumulative meta-analysis (Nunes et al., 2012) focused on the relationship between SA and sex offenders. The results indicated CCSOs have greater social anxiety than sex offenders against adults (SOA) and non-offenders, however results indicated only slightly more socially anxious than non-sex offenders. Nunes et al.'s (2012) meta-analysis included six studies in total, and the studies, published and unpublished, occurred between 1983 and 1997. The main inclusion criterion required studies utilized the Social Avoidance and Distress Scale (SADS; Watson & Friend, 1969). The limitations of this analysis include the exclusion of other measures or tools to assess SA, and no consideration of the methodological weaknesses or strengths of the individual studies included in the analysis. Furthermore, the heterogeneity of sex offenders was not considered due to the small sample size, as this would require an examination of the differences between subgroups of sex offenders according to victim

characteristics (e.g. victim gender, relationship with victim), sexual disorder diagnosis or offender typology.

Often meta-analyses combine studies without consideration of the quality of included studies (Petticrew & Roberts, 2006). Unlike the meta-analysis by Nunes et al. (2012), this systematic review will assess the quality, and critically appraise, all the primary research in this area, expand the number of studies through the inclusion of a greater range of outcome measures, and include studies published up to 2013.

1.3. Aims of review

A systematic review uses rigorous methods for critically appraising the literature with a clear and systematic approach to identify studies, and addresses key aspects of study design that may introduce internal or external bias (NICE; 2009). This review aims to appraise the available literature regarding the association between SA and sex offending. Sex offenders are a heterogeneous group (Hickey, 2006) and this review will therefore focus on contact sexual offenders against children.

The present review aimed to include studies measuring SA through multiple psychometric instruments, behavioral measures and structured clinical interviews. This widens the scope of the review beyond the meta-analysis completed by Nunes et al. (2012), to answer the following question: *'Is there evidence for social anxiety in contact child sex offenders?'* This review intends to complement existing reviews and meta-analyses, and to add clarity regarding quality of the primary research, in order to inform future research and practice.

There is an increasing recognition that assessment and treatment of mental disorders within offenders is relevant, as treating ‘needs’ beyond those that are purely ‘criminological’ increases the probability of successful rehabilitation (Harsch, 2006), and therefore understanding the role of social anxiety is imperative.

2. Method

This systematic review followed guidelines set out and recommended by the Centre for Reviews and Dissemination (CRD) of the University of York (CRD, 2009), Meta-analyses of Observational Studies in Epidemiology (MOOSE; Stroup et al., 2000) and Methodology Checklist for Systematic Reviews and Meta-analyses (Scottish Intercollegiate Guidelines Network 50; SIGN 50; Annex C, 2013).

2.1. Inclusion and exclusion criteria

2.1.1. Study Design

Eligible studies were quantitative, descriptive or observational. Studies were eligible for inclusion if the primary or secondary aim examined (a) the prevalence of SA among child sex offender subjects and/or (b) the association between SA and child sex offenders. Studies had to be peer reviewed, original publications and published in English (due to translation limitations). Reviews of the literature, commentaries and editorials were excluded.

2.1.2. Population

Studies based on adult (18+ years old) males who were convicted on contact sexual offences against children were included. Sex offenders with an additional diagnosed sexual disorder are included in the review (e.g. paraphilia). Due to the heterogeneous

nature of sex offenders (Seto & Lalumiere, 2010) studies based on female sex offenders, adolescent sex offenders, and sex offenders with known intellectual disabilities were excluded. Some studies included did not necessarily look at SA per se but Axis I disorders or components of SA such as ‘fear of negative evaluation’ or ‘social skills’, and their relationship to sex offending.

2.2. Literature search criteria

2.2.1. Search Strategy

The primary author of this review (SP) conducted a search of the following electronic databases for relevant literature up to April 1, 2013: ASSIA (Applied Social Sciences Index and Abstracts), BIOSIS Previews, EMBASE, Medline, PsycINFO, ProQuest, and Web of Knowledge. The publications were limited to peer reviewed published journals from 1980-2013. Additionally, key journals highlighted in the early scoping searches were hand searched, because electronic searches depend on databases correctly indexing studies, and errors in indexing can occur frequently (Petticrew & Roberts, 2006). The Journal of Clinical Psychiatry, Journal of Sexual Aggression, and Sexual Abuse: A Journal of Research and Treatment were hand searched between 2003 and 2013. Detailed search strategies used the keywords presented in Table 1.1. Key words from other sex offender studies were also searched in conjunction with social anxiety/phobia. Additionally, it was decided to expand the terminology for social anxiety to include ‘social distress’, ‘social avoidance’ and ‘social competencies’ similar to Nunes et al. (2012). Strategies were revised appropriately for each database to take account of differences in controlled vocabulary and syntax rules.

Table 1.1: Search term strings used in the systematic search

	Search term string
Term 1	'sex* offend*'; or 'rape'; or 'rapist*'; or 'child molest*'; or 'p?edophil*'; or 'sex* assault'; or 'incest'; or 'indecent exposure'; or 'sexual* devian*'; or 'paraphilia*'; or 'child pornography'; or 'crimin*'; or 'voyeurism'; or 'exhibitionist'
	AND
Term 2	'social anxiety'; or 'social phobia'; or 'social avoidance'; or 'social distress'; or 'social competencies'

(NB American/ British Spelling, *: truncation for multiple endings).

2.2.2. Study selection

After duplicates were removed, the various search strategies resulted in a total of 915 studies. The titles were screened with respect to inclusion and exclusion criteria, resulting in 145 studies. Those studies disregarded at this stage were either clearly unrelated to the aims of the systematic review, or examined excluded populations. The abstracts of the remaining studies were examined according to the criteria, resulting in 28 potential studies to be included in the review. The included studies were obtained as complete articles, read in full and considered for inclusion. At this stage, 10 studies were excluded. Eighteen studies were included in the review, upon examination these were mainly three types: (1) descriptive clinical interview, (2) psychometric measures of anxiety or (3) experimental studies, which are considered separately within the review. See Figure 1.1 for flow diagram of the literature search and study selection.

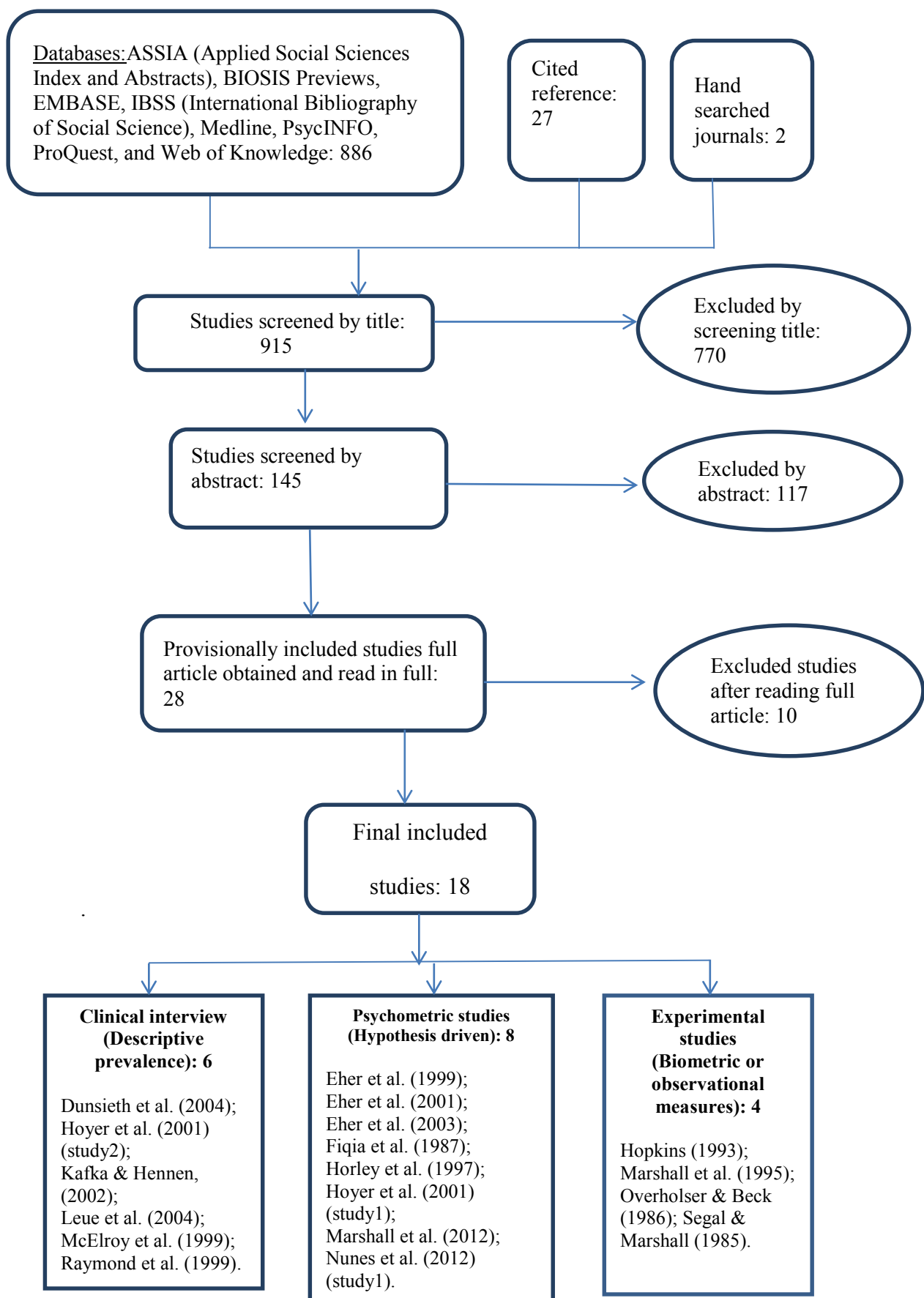


Figure 1.1: Diagram of literature search process.

2.3. Assessment of methodological quality

To evaluate the methodological quality of each study a specially adapted quality tool was developed. A systematic search of the literature had been undertaken for valid quality assessment tools in the sex offender literature. The Maryland Scientific Method Scale (SMS) (Farrington, 2003) is extensively used in the area. Hanson and Morton-Bourgon (2009) developed a scale specific to the requirements of this area based on 'Risk, Needs, Responsivity'. However, both these measures are designed to assess the effectiveness of intervention studies, and were not suitable for the present study.

The quality tool was developed from existing guidelines to accommodate observational studies included in the review. These included SIGN 50 critical appraisal checklist for cohort studies (SIGN 50, 2013), Quality Appraisal Checklist for quantitative studies reporting correlations and associations (NICE, 2009) and Quality Assessment Tool for Quantitative studies (Thomas, 2003). The tool by Thomas (2003) was recommended in a review of non-randomized quality assessment tools (Deeks et al., 2003). The quality criteria aimed to assess the risk of selection bias, detection bias, confounders and statistical bias, by the amalgamation of different criteria related to each category. The majority of the criteria were scored 'Yes', 'No', 'Can't say' or 'Not applicable', though some criteria had different responses e.g. selection bias was scored 'highly likely', 'somewhat likely' 'Not likely' and 'can't say'. In total there were fifteen questions, an overall rating of quality was provided based on the number of criteria met. Overall studies were rated 'Weak' (0-5), 'Moderate' (6-10) and 'Strong' (11-15). A second-rater verified inter-rater reliability, randomly rated a third of the studies independently, an adequate inter-rater consistency with Kappa co-efficient .78 was found (Randolph, 2008) and disagreements were reconciled through discussion.

3. Results

Further details of all studies and their main findings are presented in Table 1.2. Quality ratings of studies are presented in Table 1.3 and overall summary of quality are presented in Table 1.4.

Table 1.2 Summary of main findings for all studies

Author, date /country	Setting / Population	Sample (N)	Type study	Outcomes/ Measures used	Main findings
Dunsieth et al. (2004) USA	Setting: Residential treatment facility. Comparators: Sex offenders with PA & without PA.	N=133 PA =64 Without PA=26	Descriptive	SCID II** SCID-I/P	Anxiety disorders were more prevalent among paraphilic sex offenders. Social Anxiety diagnosis: PA group: Lifetime 13.1%. Non-PA group: Lifetime 0%.
Hoyer et al. (2001) Germany <u>Study 2</u>	Setting: State forensic hospital. Comparators: MDO Sex offenders with PA or ICD.	N=55 PA = 30 ICD= 25	Descriptive	Mini- DIPS** SIAS* SPS*	Study 2 found a high lifetime and point prevalence of social anxiety in PA individuals, corroborating evidence found in questionnaire results. Social anxiety diagnosis: PA group=Current 23.3%; Lifetime 53.3% ICD group= current: 8%; Lifetime: 20%
Kafka and Hennen (2002) USA	Setting: outpatient Comparators: Individuals with PA and non-offenders with PRD.	N=120 PA=88 (includingSex offenders=60) PRD =32	Descriptive	Symptoms checklist-DSM-IV Axis I diagnoses** Psychiatric interview***	Social Anxiety diagnosis: PA group: Lifetime SA: 20.4%/ PRD group: Lifetime SA: 25%;
Leue et al. (2004) Germany	Setting: State forensic Hospital. Comparators: Sex offenders with PA or ICD.	N=55 PA = 30 ICD =25	Descriptive	MINI-DIPS** Clinical structured interviews (DSM-IV).	SA most common among PA sexual offenders. Social Anxiety diagnosis: PA group: current 23%; Lifetime 53% ICD group: current 8%; Lifetime 20%
McElroy et al. (1999) USA	Setting: Residential treatment facility. Comparators: Sex Offenders (SOA and CCSO).	N=36	Descriptive	SCID- IV** SCID-I/P	High rates of lifetime DSM-IV Axis I disorders, 58% were diagnosed with a PA. Social anxiety diagnosis: PA: Lifetime SA =19% Without paraphilia: Lifetime SA=13%
Raymond et al. (1999)	Setting: Residential / outpatient treatment Comparators: Sex offenders with pedophilia.	N=45	Descriptive	Structured Clinical Interview** SCID – P ** Semi-structured sexual disorder. ***	93% met the criteria for an Axis I disorder other than paraphilia. Social anxiety diagnosis: Pedophilia: current SA=31.3% Lifetime SA = 37.8% (age of onset of social anxiety 9.9(3.7 SD) years).
Eher et al. (1999) Austria	Setting: Prison Comparators: SOA, CCSO, Community male controls.	N= 57 SOA =29, CCSO =28, Community group =23	Psychometric	IIP* IAF* Structured Clinical Interview***	Groups differed significantly across the fear of negative evaluation but did not differ across socially avoidant. SOA and CCSO differ significantly on fears of being evaluated negatively by others. SOA scored the lowest on fear of negative evaluation.
Eher et al. (2001) Austria Peer reviewed	Setting: medium secure facility Comparators CCSO extrafamilial (1) male victim (2) female or both sexes victim.	N = 48 CCSO Male victim =18 Female/or both = 30	Psychometric	STAI*, SIAS*, SPS*, SKID** MTC:CM3 typology	No significant differences were found on anxiety, or social anxiety scales, only reported means. Exclusively male target offenders were found to be less socially competent on MTC:CM3 typology.
Eher et al. (2003) Austria	Setting: Medium security institution Comparators: (1)SOA: Nonparaphilic & nonsexualize (MTC:R3) (2)SOA: PA & sexualized (MTC:R3) (3) CCSO (MTC:CM3).	N=97 Group 1: n= 22 Group 2: n= 30 Group 3: n=45	Psychometric	STAI*, SIAS*, SPS* SKID I and SKID II** MTC: CM3 and MTC:R3	CCSO (group 3) significantly higher than SOA (group 1 and group2) on social interaction anxiety scale. No significant difference on social phobia scale. Social anxiety diagnosis was not reported.

Author, date /country	Setting / Population	Sample (N)	Study type	Outcomes/ Measures used	Main findings
Figia et al. (1987) UK	Setting: Prison Comparators (1)Sex offenders (2) NSO	N= 69 Sex offenders =32 NSO =37	Psychometric	SCS*, FNE*, SSS*	Sex offenders reported more social anxiety, fear of negative appraisal, and indirect hostility than NSO. A multiple regression analysis showed hostility, fear of negative evaluation, and social skill deficits were the best predictors of total violent crimes, whereas total sex crimes not predicted by any factor.
Horley et al. (1997) Canada	Setting: Maximum secure institution. Comparators: CCSO & NSO.	N=138 CCSO =68 NSO =70	Psychometric	Semantic differential: Rep-grid SADS*	Social anxiety was not the focus of the study but was measured as a covariate. However, there was no significant difference between groups on social anxiety.
Hoyer et al. (2001) Germany <u>Study 1</u>	Setting: Forensic hospital Comparators: Sex offenders with PA, Sex offenders with ICD, NSO.	N =102 PA = 42 ICD = 30 NSO = 30	Psychometric	SIAS*, SPS* DSM-IV criteria for PA & ICD.	<u>Study 1</u> : Significantly higher scores for social anxiety in paraphiliacs, only for social interaction anxiety scale. High prevalence of paraphilics (51%) reached cut off for social anxiety.
Marshall, et al. (2012) Canada	Setting: Prison Comparators: ICSO CCSO	N=60 ICSO =30 CCSO =30	Psychometric	SPIN*.	ICSOs are significantly more lonely and obsessive-compulsive than CCSOs. Groups did <u>not</u> differ on SA, the ICSOs mean score in the range that meets diagnostic criteria for SA.
Nunes et al. (2012) Canada <u>Study 1</u>	Setting: Prison Comparators: CCSO & NSO	N=61 CCSO =30 NSO = 31	Psychometric	SADS*	Study1: CCSO did <u>not</u> differ significantly from NSO on the SA.
Hopkins (1993) UK	Setting: Prison (Treatment group) Comparators: Mixed group CCSO/Rapists waitlist control group.	N=8: SOA & CCSO = 4 waitlist control =4	Experimental	SADS* FNE* Landing score behavior****Vi deo ratings ****	Pre- and post- psychometric measures of treatment group reported means (SADS, FNE), showed a decrease in social anxiety following the group.
Marshall et al. (1995) Canada	Setting: Outpatients Comparators: SOA, CCSO SES matched NSO & university students.	N=95: SOA = 19 CCSO =36 SES similar NSO = 20, University students =20.	Experimental	SSEI*, SADS*, SRI*. Rate appropriate behavior of actors.	CCSO were the most lacking in social self-confidence, socially anxious, and unassertive, but did <u>not</u> differ in response from the SES matched nonoffenders. Suggesting social deficits are derived from background.
Overholser and Beck (1986) USA	Setting: Medium secure prison. Comparators CCSO, SOA, NSO, Community NO low SES & students.	N=60: (12 participants per group)	Experimental	MAACL*, SADS*, FNE* Observations of role plays, GSR****, Timed Behavior Checklist for anxiety****.	Hetersocial skills deficits were observed in CCSO and SOA in comparison to other groups. SADS was <u>not</u> significant across groups, but on FNE there was a sign effect. Newman-Keuls test identified CCSO displayed significantly more fear of negative evaluations.
Segal and Marshall, (1985) Canada	Setting: Maximum secure Prison Comparators: CCSO, SOA, NSO, NO low SS and NO high SS.	N=100 (20 participants per group)	Experimental	SADS*, SISST*, SHI*, Behavioral assessment****	Significant group differences on social anxiety. Post hoc analyses showed sex offenders did not differ from NSO. Though CCSO were significantly higher than SOA. CCSO rated themselves as less skilled and more anxious.

Abbreviations: Disorders: PA: Paraphilia; PRD: Paraphilia related disorder, NP: Non-paraphilia, ICD: Impulse control disorder.
Offender type: CCSO: Contact Child Sex Offender; ICSO: Internet Child Sex Offender; NSO: Non-sex offender; NO: Non-offender, SES: Socioeconomic

Measures of Social Anxiety

Psychometrics:

*SIAS Social Interaction Anxiety (Stangier et al., 1997) measure social anxiety in interactions with other people

*SPS: Social Phobia (Strangier et al., 1997) measure social anxiety in situations where one can be observed but not necessarily interacting with other people.

Structure tool for clinical interview:

**SCID-I/P (Spitzer et al., 1996) and SCID II (Spitzer et al., 1990): Structured Clinical Interview for DSM- IV

** SCID – P to diagnose both axis I and axis II disorders

** SKID-I/P (Wittchen et al., 1997) and SKID II (Fydrinch et al., 1997): Structured Clinical Interview for DSM- IV (German version)

**Mini-DIPS (Margraf et al., 1996) is a structured interview to diagnose axis I disorders according to the DSM-IV, for lifetime and point prevalence.

No tool utilized:

*** Clinical interview by Psychiatrist

***Semi-structured interview (Raymond & Coleman, 1999). Developed a semi structured interview to evaluate the presence or absence of all the disorders in the sexual disorders chapter, following the SCID-P format, as no standardized structured interview was available to diagnosis for sexual disorders.

Psychometrics:

*SADS: Social Avoidance and Distress Scale (Watson & Friend, 1969) to assess anxiety in, and avoidance of social situations.

*SSEI: Social Self-Esteem Inventory (Lawson et al., 1979) to assess self-confidence and social interactions

*SRI: Social Response Inventory (Keltner et al., 1981) measures both underassertion and overassertion (progressiveness) in response to various social demands or to distress caused by the actions of another person.

* MAACL: Multiple Affect Adjective Checklist (Zucjermann & Lubin, 1965) list of adjectives to describe how an individual typically feels.

*FNE: Fear of Negative Evaluation (Watson & Friend, 1969) measures anticipation and apprehension concerning the evaluation in a negative way by others and avoidance of negative situations.

*SISST: Social Interaction Self-Statement Test (Glass et al., 1982)

*SHI: Survey of Heterosexual interactions (Twentyman et al., 1981)

Behavioral experiments:

****Landing staff rating of social behavior: Landing staff reported the social behavior of both treatment and control groups on the wing over 8 weeks (It was hoped they were blind to which individuals were participating in treatment and which were waitlist control).

****Video-taped interviews rated blindly by independent observers: Video tapes of interviews pre and post treatment being interviewed by an unknown female (both participant and interviewer were instructed not to mention the group. Six independent rates menaced: non-verbal skills, conversational ability and speech on a scale from 1-5, 1(indicating a deficit), 3 (appropriate use of skill under consideration) and 5 (an excess).

****TBCL – Anxiety modified (Kern, 1982)-observer measures the occurrences and non-occurrences of five main categories of behavior (hand and arm movement, hand and arm restraint, foot and leg movement, body movement and lip movement).

****In vivo In Vivo: Behavioral assessment: Engage in conversation role play with female confederate for as long as he felt comfortable. If level of discomfort was great enough to want to escape, then would signal to experiment to end experiment. If continued to talk at ease, conversation would last 7minutes. Length of conversation was a measure of avoidance behavior (Twentyman et al., 1981)

****GSR: Galvanic Skin Response. An Enting Conductron 330 portable GSR machine was used to provide a physiological measure of anxiety (5min adaption period and 5min baseline).

3.1. Summary of descriptive studies

In total there were six descriptive studies with a primary focus on comorbidity of Axis 1 disorders among sex offenders, rather than SA specifically. The countries of origin for these studies were the USA (4) and Germany (2). The studies were published between 1999 and 2004. The mean sample size was 64 sex offenders (ranging from 36-133 participants). One research group carried out two of the studies with data overlap (Dunsieth, et al., 2004; McElroy et al., 1999). The settings for the studies were Forensic State Hospital (2), residential treatment (2), outpatients (1) or a combination of outpatients and residential treatment (1).

One challenge faced by researchers studying sex offenders is the heterogeneity of the population and comparison with an appropriate group. The present studies fell into the following categories. Firstly, studies which defined samples by diagnostic criteria of DSM-IV sexual disorders. These included paraphilia versus impulse control disorders (Hoyer, Kunst, & Schmidt, 2001; Leue, Borchard, & Hoyer, 2004) or CCSO with paraphilia compared to CCSO without paraphilia (Dunsieth, et al., 2004). Kafka and Hennen (2002) compared a 'mixed' group of sex offenders (N=60) and non-sex offenders with paraphilia (N=28) versus non-sex offenders with paraphilia related disorders (N= 32). Secondly, one study compared according to offence type; rapists versus CCSO (McElroy et al., 1999). Thirdly, one study had no comparison group, and solely investigated males with pedophilia, one subtype of paraphilia (Raymond, Coleman, Ohlerking, Christenson, & Milner, 1999).

All the studies utilized methods based on DSM-IV criteria to diagnose Axis I disorders. Five studies used a structured clinical interview tool, the SCID I or MINI-

DIPS. Kafka and Hennen (2002) used a semi-structured intake questionnaire and a clinical interview by a psychiatrist. Of note, the detention of sex offenders within forensic hospitals differs according to the different mental health laws for each country. For example in Germany and Austria, offenders are detained under penal law for therapeutic purposes, including primary diagnosis of substance abuse, unlike in the UK and USA. Therefore, this may influence the generalizability of the studies. All studies reported descriptive statistics and those comparing subgroups used statistical analysis including chi-squared test (Hoyer et al., 2001; Kafka & Hennen, 2002; Leue et al, 2004;) or 2-tailed Fisher exact test and Wilcoxon rank sum test (Dunsieth et al., 2004; McElroy, 1999). Only Leue et al. (2004) carried out interviews by two investigators and reported inter-rater reliability and Hoyer et al. (2001) reviewed the investigators' assessments by experienced supervisors.

3.2. Methodological quality of descriptive studies

3.2.1. Study objectives

These studies did not specifically focus on SA, but there were clearly reported questions regarding comorbidity of Axis I disorders in sex offenders. The specific questions were to understand mental illness within sex offending samples and reported SA comorbidity.

3.2.2. Selection bias

Two of the descriptive studies were scored 'highly likely' on selection bias process, due to being convenience samples from forensic hospitals. Three studies scored 'somewhat likely' due to samples drawn from clinics. The bias impairs the extent to which findings can be generalised across settings. All studies were part of an admission assessment for treatment, with the majority of participants either court ordered or referred for

treatment. Kafka and Hennen (2001) scored ‘highly likely’ as participants were voluntary patients seeking treatment. The exclusion criteria were not clearly defined; three studies excluded individuals with psychosis, neurological disorders or learning disabilities, which may impact on the representativeness of the group. Previous research indicates that schizophrenia and psychosis rates are 5-10% of general samples of sex offender population, whereas within psychiatric settings, rates are significantly higher, ranging from 50-100% (Stinson & Becker, 2011).

3.2.3. Detection bias

Detection bias was divided into four relevant factors: outcome, blinding, validity and reliability of outcome, and reliable measure of group allocation. Within these studies the outcome focus was Axis I disorders, five studies scored ‘yes’ for outcome defined, though Kafka and Hennen (2002) was considered inconclusive. Although SA prevalence was reported as an outcome, it was not clearly defined in these studies. All studies scored ‘no’ on blinding. It was inconclusive whether participants were blind to the study objective as it was part of treatment assessment. Only one study (Dunsieth et al., 2004) acknowledged the limitation of the non-blinded bias.

The two studies using the MINI DIPS I reported the reliability. Four of the studies did not report reliability and validity were scored as ‘no’, although three of the studies used the SCID I, which has standardized validity and reliability documented in previous studies (Lobbestael, Leurgans & Arntz, 2011). Kafka and Hennen (2002) scored ‘no’ as they did not use a structured clinical tool to assess Axis I disorders, instead using a semi structured questionnaire and a follow up clinical interview by a Psychiatrist. Additionally, as there is no structured tool to diagnose sexual disorder by

diagnostic criteria defined by DSM-IV, four studies developed inventories based on the DSM-IV criteria, though there is no reliability or inter-rater reliability reported.

3.2.4. Confounders

Three studies were scored as inconclusive as they reported some confounders but did not report differences between groups, or did not report significance or impact on SA. Hoyer et al. (2001) and Leue et al. (2004) were scored as 'yes' because they identified confounders and matched samples on analysis, for age and length of incarceration. Within observational studies, confounders are an important factor. Although five studies reported the prevalence of lifetime substance misuse, the impact was not considered. Of note a higher prevalence of substance misuse may be due to German and Austrian laws treating sex offenders with substance misuse in hospitals rather than prison. Social desirability was not measured in any study. This may have impacted detection bias, due to sex offenders wishing to provide socially desirable responses or to access treatment, which may be seen as more lenient than a prison sentence.

3.2.5. Statistical Bias

All studies used appropriate analytical methods considering the small sample sizes. However, none of the studies reported a power analysis or confidence intervals.

3.2.6. Results

Results indicate for current prevalence of SA in CCSO with paraphilia ranged from 23 - 23.3%. The lifetime prevalence of SA assessed in CCSO with paraphilia ranged from 13.1 - 53.3%. Overall, there was a stronger association with CCSO diagnosed with paraphilia to current and lifetime prevalence of SA. These are exploratory studies, and

reporting of information was limited.

3.3. Summary of psychometric (hypothesis driven) studies

The second type of studies in the review is hypothesis driven psychometric studies which considered the relationship between SA or the related component ‘fear of negative evaluation’ and sex offending. Of these eight studies, the countries of origin were Canada (3), Austria (3), Germany (1) and UK (1). Notably, all the studies from Austria were carried out by the same research group, which may introduce bias (Eher et al, 1999; 2001; 2003). Nunes’ et al. (2012) study 1 was included as it was completed separately from their meta-analysis (study 2). The studies took place between 1987 – 2012, and included sex offenders from various settings: forensic hospitals (4) and prisons (4). The total number of sex offenders was 465, with a mean sample size of 58, ranging from 30 - 97 participants per study. Sex offender groups were often further divided into subgroup categories, with average subgroup samples ranging from 22 - 42 sex offenders.

The studies’ subgroups were defined by the following categories. Firstly, most studies defined samples mainly by offence type: CCSO versus rapists (Eher et al., 1999), or versus Internet child sex offenders (ICSO) (Marshall, O’Brien, Marshall, Booth & Davis, 2012), or versus incarcerated non-sex offenders (Horley, Quinsey & Jones, 1997; Nunes et al., 2012). In one study, Eher et al. (1999), sex offenders as a group were also divided according to violence level (high vs. low) (Wong, Lumsden, Fenton & Fenwick; 1994). Secondly, two studies compared subgroups of CCSO by defining groups by victim gender, as studies have found that ‘boys only’ victim type as a variable significantly contributed to sexual recidivism (Hanson, Steffy & Gauthier,

1993). Thirdly, sex offenders were defined by DSM-IV sexual disorders, compared participants with paraphilia versus impulse control disorders (Hoyer, Kunst, & Schmidt, 2001). Fourthly, Fiqia, Lang, Plutchik and Holden (1987) did not differentiate between CCSO and rapists. Finally, Eher, Fruehwald and Frottier (2003) defined sex offenders groups by typology on Massachusetts Treatment Center Child Molesters 3 (MTC: CM3; Knight & Prentky, 1990) to compare non-sexual rapist versus sexual rapist versus pedophilia.

Of the eight studies, five compared sex offenders to control groups, four of these studies with non-sexual offenders. All eight studies used self-report measures to assess SA or elements of it, e.g. fear of negative evaluation. All studies were cross-sectional and reported descriptive statistics and those comparing subgroups used statistical analysis: ANOVAS, MANOVAS, stepwise regression, t-tests, chi squared, correlation matrix, multi regression, product moment correlations, Bonferroni corrected post hoc and Scheffe tests.

3.4. Methodological quality of psychometric studies

3.4.1. Study objectives

All studies were scored ‘yes’ as the objectives and questions were clearly reported, although not all specifically focused on SA. For three studies, SA was a primary focus, for four studies SA was the secondary focus within a psychiatric co-morbidity focus and one study measured SA as a covariate.

3.4.2. Selection bias

Due to the nature of recruitment of sex offenders from different facilities (Prisons,

Forensic Hospitals), all studies were scored ‘Highly likely’. This is likely to impact on the generalizability of these studies. The participation rate was often not reported, and when it was reported the drop out at this stage was very low, at less than the 20% norm e.g. 1% -7.3% (Eher et al., 2003; Horley et al., 1997).

3.4.3. Assessment and data collection

For three studies, the focus of the assessment was SA (Hoyer et al., 2001; Marshall et al., 2012; Nunes et al., 2012; study 1). In the remaining studies SA was a secondary outcome; some focused on psychiatric disorders including SA (Eher et al. 2001; Eher et al., 2003). Horley et al. (2001) measured SA as a possible covariate in their study. Eher et al. (1999) and Fiqia et al. (1987) focused on fear of evaluation and social skills. All studies clearly defined the outcomes. As all studies used self-report psychometric measures, and therefore participants may have been aware of the research question, all were rated as ‘can’t say’. Validity and reliability of scales used was only reported in three studies, notably the more recent studies, which may indicate changes in report writing for journals, rather than the quality of the research per se. Although, it is of note these studies were within a forensic setting and none of the measures were validated within this setting.

3.4.4. Confounders

Within the studies there are a number of possible confounding factors. Two studies (Eher et al., 1999; Horley et al., 1997) were scored as “Can’t say” in this regard, as they considered the number of incarcerations and level of violence; however the descriptive characteristics for sex offenders groups were reported as a group rather than subgroups. The remaining six studies were rated as ‘yes’ because these studies considered possible

confounding factors in the design with various comparison control groups and analysis of demographic characteristic, consideration of factors within the analysis to assess if differences existed between samples. However, no studies measured social desirability.

3.4.5. Statistical Bias

None of the studies reported a power calculation, therefore a medium effect size was assumed, as it is the most common size of effect within psychological research (Green, 1991). The power calculations offered by Cohen (1998) were used to judge whether these studies obtained sufficient power; by this measure all studies lacked sufficient power, due to the small sample sizes. Nunes' et al. (2012) study 1 was the only one that reported effect size and confidence intervals. The effect sizes obtained by the other studies were calculated by the principle investigator, or sourced from Nunes' et al.'s (2012) study 2 meta-analysis, due to one study's means and standard deviations not being reported (Horley et al., 1997). Statistical analysis methods were appropriate and rated as 'yes' for all studies. Overall, the eight studies' statistical bias was impacted by the small sample size, lack of power analysis and lack of reporting of confidence intervals.

3.4.6. Results

The variety of comparisons and experiments makes comparing results difficult. It is hard to draw definitive conclusions about the prevalence of SA in this population. SA was found to be greater in CCSO who met the DSM IV criteria for pedophilia (Eher et al 2003) or met the DSM IV criteria for paraphilia (Hoyer et al., 2001) or CCSO with exclusively male victims. Eher et al. (1999) found fear of negative evaluation was greater in rapists. Fiqia et al. (1987) found sex offenders as a group were more socially anxious than violent offenders. Yet, contrary to these findings, three studies did not find

a significant difference between CCSO and violent offenders (Horley, 1997; Nunes et al., 2012) or CCSO and ICSO (Marshall et al. 2012). Overall, these studies have utilized a variety of psychometric measures and different methods to allocate participants to comparison groups.

3.5. Summary of experimental (observational) studies

The final category of studies is experimental based, considering the link between SA and sex offending. In addition to self-report psychometrics, these studies also employed naturalistic behavioral experiments (Hopkins, 1993; Marshall, Barbaree & Ferandez; 1995; Overholser & Beck, 1986; Segal & Marshall, 1985) with measurements of SA via behavioral observation or physiological measures (e.g. Galvanic Skin Response). Of these four studies, the countries of origin were Canada (2), USA (1) and UK (1). These studies took place from 1985-1995 and included sex offenders from prisons (3) and outpatients (1).

The total number of sex offenders was 127, ranging from 8 to 55 participants per study. Participants were categorized into subgroup by offence type within these studies (CCSO or rapist) ranging from 12-20 per group. Marshall, Barbaree and Ferandez (1995) separated CCSO further by victim gender. Hopkins (1993) did not differentiate offence type, with a 'mixed' group of CCSOs and rapists. This is the only intervention study that utilized a waiting list control group. The other three studies compared CCSO with a variety of groups. Two studies compared sex offenders to three control groups: non-sex offender (prisoner) group, a non-offenders low socioeconomic status group, and either a high economic status group (Segal & Marshall, 1985), or minimal dater student group criteria (single and dated less than twice in the last month) proposed by Arkowitz et al. (1975) (cited in Overholster & Beck, 1986). Marshall, Barbaree and

Ferandez's (1995) control groups were community and a student group, excluding individuals who reported fantasy or enacted a sexual offence. The exclusion was 35% of the control samples. This was lower than typical exclusion base rate for this criterion; 42-61% in previous studies (Marshall et al. 1995).

All data in the studies are from a single time point/testing session and three studies reported demographic descriptive statistics and performed statistical analysis, except one (Hopkins, 1993). Studies comparing subgroups used statistical analysis: ANOVAS, correlation matrix, ANCOVA and Newman-Keuls test.

3.6. Methodological quality of experimental studies

3.6.1. Study objectives

Within the experimental studies, the focus was hetero-social skills, social skills and social competence. In three studies, the objectives and questions were clearly reported, although not specifically focused on SA, which was a secondary outcome. Hopkins (1993) was scored as 'no' as the aims of the group were reported, rather than the aim of the study.

3.6.2. Selection bias

Three studies were rated as 'highly likely' as the participants were selected from prison settings of different levels of security. Hopkins (1993) did not describe the referral process for the group, or indicate participation rate. Marshall, Barbarbee and Ferendez (1995) was scored as 'somewhat likely' as sex offenders were recruited from an outpatient clinic and matched with SES controls. The exclusion criteria for controls were previous fantasies or enactment of a sex offence, reporting an exclusion of 33% of the control sample. Participation rate was not reported but it is probable that this was

high due to payment made to non-offenders and the mandatory nature of treatment in prison settings.

3.6.3. Assessment and data collection

The unique quality of these studies is the multiple methods of outcome assessment, which increases confidence in the data when the construct is measured more than once: all studies score 'yes' on this factor. Two studies reported inter-judge reliability for observations (Overholster & Beck, 1986; Segal & Marshall, 1985) and one study had six independent rater-scored observed behaviors (Hopkins, 1993). Due to the nature of the experiments, three studies, which included blinded assessors of anxious behavior, were scored 'yes' (Hopkins, 1993; Overholster & Beck, 1986; Segal & Marshall, 1985). Hopkins et al. (1993) was a group intervention evaluation, therefore it is possible participants were aware of the aim of the research. The other studies do not report if participants were blind to the research question.

The reliability and validity of the measures used by the studies was scored as 'no' for three studies due to lack of reporting, though of note standardized psychometrics were used, though were not validated within this a forensic setting. Marshall et al. (1995) reported reliability and validity. All the studies used self-report measures but no studies measured social desirability.

3.6.4. Confounders

Three of the studies were scored as 'Yes', as possible confounding factors were considered and employed matched control groups in the design. Only Overholster and Beck (1986) matched groups on multiple demographics variables including length of

incarceration, due to possible incarceration effects or social stigma related to being in contact with criminal justice services. Marshall et al. (1995) reported co-varying age as a factor in previous studies and in the present research did not affect the outcome of the analysis on the dependent variables. Hopkins (1993) did not report demographic statistics or confounders in their study; although a waiting list control group was utilized, reporting of variables was omitted therefore the study scored 'no'.

3.6.5. Statistical Bias

Three studies score 'Yes' for sufficient power, appropriate analytical methods and reporting confidence levels, though did not report effect size. Hopkins (1993) scored 'no' for all factors due to an extremely small sample and no statistical analyses.

3.6.6. Results of studies

These innovative experimental studies utilized a variety of original methods to measure SA and social skills in sex offending samples. From the studies it is suggested CCSO have greater SA than rapists, non-offenders and community controls. However, there is not a significant difference between community controls with low SES and outpatient sex offenders (Marshall et al., 1995). In addition, these sex offenders were only considered by offence type with no consideration for diagnosis of paraphilia or Impulse Control Disorders.

Table 1.3 Quality ratings for criteria of studies.

Author	Internal Validity													
	Study Objective	Selection Bias		Detection Bias							Confounder	Statistical Bias		
		Selection Process representative	Participation rate	Outcome Defined	Blinded Assessor	Blinded Participant Aware of research question?	Acknowledge limitation of binding	Measure of group allocation	Validity & reliability	Outcome measured more than once	Identified and taken into account in design or analysis.	Power reported	Analytical methods appropriate	Confidence intervals reported
OPTIMUM REPOSE	YES	NOT LIKELY	YES	YES	YES	YES	N/A	YES	YES	YES	YES	YES	YES	YES
Dunsieth et al. (2004)	Yes	Somewhat likely	No	Yes	No	Can't say	Yes	Can't say	No	No	Can't say	No	Yes	No
Hoyer et al. (2001) Study 2	Yes	Highly likely	No	Yes	No	Can't say	No	Yes	Yes	Yes	Yes	No	Yes	No
Kafka and Hennen, (2002)	Yes	Highly likely	No	Can't say	No	Can't say	No	Can't say	No	No	Can't say	No	Yes	Yes
Leue et al. (2004)	Yes	Highly likely	Yes	Yes	No	Can't say	No	Yes	Yes	No	Yes	No	Yes	No
McElroy et al. (1999)	Yes	Somewhat Likely	No	Yes	No	Can't say	No	Can't say	No	No	Can't say	No	Yes	No
Raymond et al. (1999)	Yes	Somewhat likely	N/A	Yes	No	Can't say	No	Can't say	No	No	N/A	No	No	No
Eher et al. (1999)	Yes	Highly likely	No	Yes	N/A	Can't say	No	Yes	No	Yes	Can't say	NO	Yes	No
Eher et al. (2001)	Yes	Highly likely	No	Yes	N/A	Can't say	Yes	Yes	No	Yes	Yes	No	Yes	No
Eher et al. (2003)	Yes	Highly likely	Yes	Yes	N/A	Can't say	No	Yes	No	Yes	Yes	No	Yes	No

Author	Internal Validity													
	Study Objective	Selection Bias		Detection Bias							Confounder	Statistical Bias		
		Selection Process representative	Participation rate	Outcome Defined	Blinded Assessor	Blinded Participant Aware of research question?	Acknowledge limitation of binding	Measure of group allocation	Validity & reliability	Outcome measured more than once	Identified and taken into account in design or analysis.	Power reported	Analytical methods appropriate	Confidence intervals reported
Fiqia et al. (1987)	Yes	Highly likely	No	Yes	N/A	Can't say	No	Yes	No	Yes	Yes	No	Yes	No
Horley et al. (1997)	Yes	Highly likely	Yes	Yes	N/A	Can't say	No	No	No	No	N/A	No	Yes	No
Hoyer et al. (2001) Study 1	Yes	Highly likely	No	Yes	N/A	Can't say	No	Yes	Yes	Yes	Yes	No	Yes	No
Marshall et al. (2012)	Yes	Highly likely	No	Yes	N/A	Can't say	No	Yes	Yes	No	Yes	No	Yes	No
Nunes et al. (2012)	Yes	Highly likely	No	Yes	N/A	Can't say	No	Yes	Yes	No	Yes	No	Yes	Yes
Hopkins (1993)	Yes	Highly likely	No	Yes	Yes	Can't say	N/A	No	No	Yes	No	No	No	No
Marshall et al. (1995)	Yes	Somewhat likely	Yes	Yes	N/A	Can't say	N/A	Yes	Yes	Yes	Yes	No	Yes	No
Overholser and Beck (1986)	Yes	Highly likely	No	Yes	Yes	Can't say	N/A	Yes	No	Yes	Yes	No	Yes	No
Segal and Marshall (1985)	Yes	Highly likely	No	Yes	Yes	Can't say	N/A	Yes	No	Yes	Yes	No	Yes	No

Table 1.4 Summary table of overall rating for quality of studies. Based on the amalgamation of criteria ratings and effect sizes calculated.

Author (year)	Study type	How well minimize bias	Considering statistical bias, sample size and power, what is the degree of association?	Are results applicable to sex offender population?
Dunsieth et al. (2004)	Descriptive	Low	Inconclusive No statistical analysis between variables	Yes
Hoyer et al. (2001) Study 2	Descriptive	Acceptable	Inconclusive No statistical analysis between variables	Yes
Kafka and Hennen (2002)	Descriptive	Low	Inconclusive No statistical analysis between variables	Yes
Leue et al. (2004)	Descriptive	Acceptable	Inconclusive No statistical analysis between variables	Yes
McElroy et al. (1999)	Descriptive	Low	Inconclusive No statistical analysis between variables	Yes
Raymond et al. (1999)	Descriptive	Low	Inconclusive No statistical analysis between variables	Yes
Eher et al. (1999)	Psychometric	Acceptable	Inconclusive (data not reported)	Yes
Eher et al. (2001)	Psychometric	Acceptable	Inconclusive (Data not reported).	Yes
Eher et al. (2003)	Psychometric	Acceptable	Moderate SIAS: CCSO & Rapist (sexualized) $d = .45$, CCSO & Rapist non sexual) $d = .52$ SPS: CCSO & Rapist (sexualized) $d = .27$, CCSO & Rapist non sexual) $d = .51$	Yes
Fiqia et al. (1987)	Psychometric	Acceptable	Moderate Social anxiety: Sex offender & NSO $d = .51$ FNE: Sex offender & NSO $d = .46$	Yes
Horley et al. (1997)	Psychometric	Low	Weak No means of SAD reported. No significant difference between groups Effect size (Nunes et al., 2012) CCSO & NSO $d = .12$	No

Author (year)	Study type	How well minimize bias	Considering statistical bias, sample size and power, what is the degree of association?	Are results applicable to sex offender population?
Hoyer et al. (2001) Study 1	Psychometric	Acceptable	Moderate SAIS: PA & ICD ($d = .43$); PA & NSO ($d = .62$); ICD & NSO ($d = .15$) SPS: PA & ICD ($d = .14$); PA & NSO ($d = .36$); ICD & NSO ($d = .17$)	Yes
Marshall et al. (2012)	Psychometric	Acceptable	Weak CCSO & ICSO ($d = .14$)	Yes
Nunes et al. (2012)	Psychometric	Acceptable	Weak CCSO & NSO ($d = .03$)	Yes
Hopkins (1993)	Experimental	Acceptable	Weak (Limited sample and analysis, unable to calculate effect size)	Inconclusive
Marshall et al. (1995)	Experimental	Acceptable	Moderate Effect size on SADS CCSO(male victim) & rapist ($d = 0.43$); CCSO(female victim) & rapist ($d = 0.84$); CCSO (m) & NO(uni) ($d = 0.64$); CCSO (f) & NO(uni) ($d = 1.10$); CCSO (m) & NO (SES) ($d = 0.04$); CCSO (f) & NO (SES) ($d = 0.43$)	Yes
Overholser and Beck (1986)	Experimental	Acceptable	Weak/ Inconclusive Effect size unable to calculate for psychometrics. For behavioral assessment of anxiety: CCSO(ex) & Rapist: control ($d = 0.04$) during role play ($d = 0.07$); CCSO (ex) & NSO control ($d = 1.2$) during role play ($d = 0.15$); CCSO (ex) & NO (low SES) control ($d = 0.37$) during role play ($d = 0.34$); CCSO (ex) & NO (minimal dater) ($d = 1.1$) during role play ($d = 1.1$)	Yes
Segal and Marshall, (1985)	Experimental	Acceptable	Strong Effect size on SADS CCSO & SOA ($d = 0.86$); CCSO & NSO ($d = 0.64$); CCSO & NO(high ses) ($d = 0.86$); CCSO & NO(low ses)($d = 0.86$)	Yes

Abbreviations: Disorders: PA: Paraphilia; PRD: Paraphilia related disorder, NP: Non-paraphilia, ICD: Impulse control disorder.

Offender type: CCSO: Contact Child Sex Offender; ICSO: Internet Child Sex Offender; NSO: Non-sex offender; NO: Non-offender, SES: Socioeconomic

4. Discussion

Theories of sexual offenders against children have highlighted social skills deficits, social avoidance or fear of negative evaluation as relevant factors in the development and maintenance of sexual offending (Ward, Polaschek & Beech 2006). The current literature review widened the scope of the search, considering multiple methodologies and research designs, thus identifying eighteen studies. Eight of the eighteen studies were rated inconclusive on the quality tool to show a statistical association between social anxiety and sex offending due to statistical bias, sample size and power. Of the remaining ten studies, one study had a strong statistical association, four studies had a moderate statistical association and five studies were weak statistical association. Four of the weak statistical association studies showed no significant difference between groups on social anxiety factors. In total fourteen studies found a significant difference between groups on social anxiety, however only five of these were rated acceptable quality and moderate to strong statistical association. The systematic review suggests a possible association of SA with CCSO, as in less than a third of the studies, the quality rating was moderate or strong. Although the recent meta-analysis by Nunes et al., (2012) supported the association of SA with CCSO, this is based on primary research which was constrained by its quality. Four of the six studies from the meta-analysis were included in this review and the quality was scored as strong (1), moderate (1) and weak (2).

This systematic review investigated the primary research on SA and sex offenders to identify methodological inconsistencies within the literature, including lack of consistency in selection of comparison groups, lack of power, small sample sizes, limited reporting of effect size and a variety of measures to assess SA. However, many of these studies predate 2000 and are exploratory in nature. Of the 18 studies reviewed, only two were published after

2004, Marshall et al. (2012) and Nunes et al. (2012), which raises the question why research ceased in this area and, importantly, why the recent renewal of interest. Luisser and Cale (2013) suggest research within sex offending has had an almost exclusive focus on risk assessment and management. The results of this review warrant further research and replication on a larger scale of the more methodologically sound studies on SA and sex offending. Over recent years behavioral researchers have a greater awareness of the importance of power analysis and recommendations to always report effect size (McGrath & Meyer, 2006), raising the requirement for further high quality research.

4.1. Strengths and weaknesses

4.1.1. Sample characteristics and heterogeneity

A conceptual problem in sex offending literature concerns the heterogeneity of sex offenders and this is widely recognized (Stinson, Becker & Sales, 2008). The range of studies reviewed has compared CCSOs to multiple groups that differed in relation to nature of offence, victim characteristics and number of offences. Within the current review sex offenders were categorized into different typologies or classifications, most commonly by legal definition (offence type). However, comparisons were also made by diagnosis of sexual disorders on DSM-IV criteria or by Massachusetts Treatment Center: Child Molester Typology, versions 3 (MCT: CM3; Knight & Prentky, 1990) based on offender characteristics (e.g. victim gender, level of fixation, level of social competence). Therefore, it is inconclusive if the function of deviant sexual behavior and the role of SA may vary across these groups; there is some evidence for a greater association with paraphilia.

The evaluation of DSM-IV sexual disorders was not included in the SCID questions, therefore authors developed inventories to diagnose and categorize sex offenders based on

DSM-IV criteria. Therefore, there is a lack of consistency in the assessment of paraphilia. Interestingly, Marshall (2007) critically appraised DSM diagnoses of the paraphilia relevant to sexual offenders, and recommended a continuum approach along dimensions, rating the features of each type of sex offender from normal to seriously problematic. Furthermore, DSM-IV was used as a global definition of paraphilia and within studies specific paraphilia types were often not described. The MCT: CM3 provides a definitionally 'purer' group for research purposes but its complexity makes it unsuitable for clinical settings. Therefore, there is no universal agreement on the most comprehensive categorization, thus leading to researchers defining participants by multiple ways, making the task of comparing studies more difficult. For clinical practice this makes evidence based treatments difficult to operationalize.

4.1.2. Classification and diagnosis

Another relevant issue is the diagnosis of SA. The Diagnostic and Statistical Manual of Mental Disorders (APA, 2000) criteria have undergone developments over the years. SA was the last anxiety disorder to be added to the DSM-III, with alterations in later editions to SA in order to clearly define the disorder and assist differential diagnosis. Specifically the descriptive studies in this review, which utilized DSM-IV, will have greater clinical accuracy and specificity than other methods for assessing social anxiety. However, there are potential implications if the criteria used to assess SA have changed over the years, which may have led to different criteria being used in the different publications reviewed. The prevalence of current and lifetime SA was associated with paraphilia groups, with SA the most prevalent anxiety disorder. Interestingly three studies reported lifetime prevalence of SA in participants with paraphilia, which provide a temporal dimension and highlight the possible onset of SA pre-offence.

Comparison to the prevalence of social anxiety within the general population estimates that approximately, 7.1% and 12.1% 12-month and lifetime respectively have social anxiety (Kessler et al., 2005). Therefore, the prevalence rates reported within five of the descriptive studies indicate sex offenders with a diagnosis of paraphilia have a higher prevalence rate than the general population; however in sex offenders with paraphilia related disorders or impulse control disorders, the prevalence of social anxiety were similar to the general population. Studies did not consider the developmental and background factors in sex offenders, in particular, previous experiences of neglect, deprivation or abuse (physical or sexual). Literature in the general population suggests early life experiences of sexual, physical and emotional abuse increase the risk of developing anxiety disorders (Kuo, Goldin, Werner, Heimberg & Gross, 2011). Davis and Leitenberg (1987) estimate 19 to 58 per cent of sex offenders have been victims of physical or sexual abuse. Suggestions of potential mechanisms, or a third factor, support the ‘sexually abused–sexual abuser’ hypothesis, as sex offenders compared with non-sex offenders showed increased likelihood of having experienced child sexual abuse, while both were equally likely to have experienced physical abuse (Jespersen, Lalumiere & Seto, 2009). These factors promote the development of poor coping skills and increase an individual’s vulnerability for developing mental health disorders (Kuo et al., 2011). Adolescence is a critical time period for sexual development, and the early onset of social anxiety may play a role in the development of sexual preferences or disorders i.e. paraphilia (Jerpersen, Lalumiere & Seto, 2009; Marshall & Barbaree, 1990).

4.1.3. Sample selection and generalizability

The varied research designs in this review have a common theme in that neither diagnostic prevalence studies nor the quantitative analysis, explicitly demonstrate causality due to the

correlational nature of the studies. Therefore, there is still much to be learnt. The sample sizes across the studies examined were small, therefore may have insufficient power to detect significant differences when they exist. Additionally, the majority of studies were conducted within correctional or mental health facilities, either incarcerated or seeking treatment sex offenders. Increasing the likelihood of selection bias and reducing generalizability to the wider sex offender population.

The majority of the research was conducted in North America (ten out of eighteen studies), which may have an impact on generalizability to other countries. Noteworthy, the search criteria were restricted to studies published in English. This language restriction reduces the possibility of finding other studies with different cultural samples and limits generalizability. Populations in mental health facilities will be influenced by the different detention laws for mental illness. For example German law (German Penal Law§64: Custodial addiction treatment order) detains sex offenders for treatment of substance misuse within mental health facilities, which may skew results as anxiety disorders are often related to substance misuse (Fatseas, Denis, Lavie & Auriacombe 2010). Also, the exclusion of some participants within these settings (psychosis, Learning Disability etc.) may result in a less representative sample. Recruitment from correctional facilities, have practical and convenience advantages but may skew the samples to high-risk sex offenders. Of note, the research focus is solely on convicted sex offenders, and while it is extremely beneficial to assist understanding of this population for clinical working across settings, conclusions about non-convicted sex offenders cannot be drawn from this population. The current studies may be qualitatively different from non-convicted sex offenders, due to the process of arrest, and the impact of negative social consequences.

Some studies clearly had an overlap of participant data (McElroy et al., 1999; Dunseith et al., 2004) and others acknowledge potential overlap of research teams accessing the same participants (study 1 and study 2; Hoyer et al, 2001). The majority of the studies in the review used a variety of comparison groups. A limitation of these groups is the questionability of how accurately these groups were matched and if researchers or confederates were blind to group allocation. The most appropriate comparison group to demonstrate that SA is unique to sex offenders, is to compare with non-sexual offenders, therefore matching for the effect of being convicted and incarceration effects; only five studies included a non-sex offender group. Therefore, this has limited value for clinicians for evidence based assessment and formulation, if the SA is related to environmental factors of prison.

4.1.4. Measures

Only a few studies in this area have specifically focused on the link between SA and sex offenders. Many studies in the area were conducted in the 1980's and 1990's, as exploratory studies of Axis I or experimental studies focusing on heterosexual skills. Evident from the three groups of studies in this review is a lack of consistent methodology. Eight studies relied solely on self-report measure, leading to limitations e.g. poor recall, deception or literacy problems. Twelve studies did not report whether psychometric measures were reliable and valid, though the majority of measures were known from other research to be valid and reliable. Interestingly, nine studies used multiple methods to assess SA, which is advantageous as it increases the validity of results.

Additionally, studies systematically failed to report power and inadequately report statistical analysis. Lack of detailed reporting in studies can have an impact on the assessment

of study quality, and requires caution when interpreting results. Additionally, social desirability was not measured in any study and may be considered useful in future assessments, due to the sex offenders wishing to provide socially desirable responses or to access treatment that is more lenient.

4.2. Implications for treatment

Social anxiety effects interpersonal relationships and maintains social fears (Alden and Taylor, 2004). SA is a risk factor for subsequent depression and substance misuse (Stein, 2008). Commonly SA has an early age of onset of 11 years for 50%, and by 20 years for 80% of individuals (Stein, 2008). Yet, due to the nature of the disorder, individuals are less likely to seek psychological treatment. This review indicated possible evidence of the prevalence of SA in CCSOs. Though it is hard to draw any firm conclusions due to statistical bias, sample size and power. A strong support for a link with SA in one study, moderate support in four and weak support in five studies, in itself merits some caution in terms of speculations regarding treatment implications. Clinicians may consider SA within clinical assessment of psychological needs and risk assessment within this group. Within clinical practice, screening psychometric instruments can be used with the caveat that they may not identify lifetime diagnosis, as they only focus on the present/recent experiences. A follow up structured clinical interview will provide a lifetime presence of the disorder (Hoyer et al., 2001).

SA may lead to difficulties participating in treatment groups to address offending behavior, requiring prior psychological treatment to address SA or individual offence focused work. Psychological treatment of SA, in theory may reduce CSA, possibly via increased appropriate social interactions or increased likelihood offenders are able to engage in group based offence work. It may be worth considering novel and less stigmatizing ways to treat

SA using the Internet, as this could reduce the treatment-demand gap. Though most Internet Offenders have restricted access to the Internet and computers removed post-conviction, therefore this may prove difficult to implement as an easy access option. Differential diagnosis from other disorders, e.g. avoidant personality disorder, autistic spectrum disorder and substance misuse, which have similar presentations of isolation and limited social interaction, should also be considered. Marshall and Barbaree (1990) argued that ‘one size does not fit all’ for CCSOs. This review highlights SA is present within CCSO subgroups, though it is not consistent across all sex offenders and may be more relevant to those with paraphilia, highlighting the importance of individual assessment. CCSOs come to the attention of professionals in a variety of settings (e.g. Social Work, Mental Health and prison). Clinicians should be aware of SA in an assessment and the possible relevance in terms of treatment, such as impact on engagement in treatment to improve quality of life, self-esteem and social isolation.

Healthcare services in Scotland have responsibility for prisoner healthcare, and within this setting, interventions should consider also decreasing distress linked to SA, improving quality of life and indirectly managing risk. This review highlights the possible presence of social anxiety in CCSOs. Therefore, it is crucial to improve our understandings of clinical and psychiatric problems within this population, to provide evidence based practice and clinical governance.

4.3.Future research

Due to the heterogeneous nature of sex offender groups, categorization is a challenge for researchers. As a result this review categorized identified studies from the classification they perform: descriptive studies, psychometric (hypothesis driven) studies, and experimental

(observational) studies. The authors acknowledge that this may have limited a deeper examination beyond the methodological issues. Obstacles to completing high quality research, such as randomized control trials within the sex offending area, include claims that they are unethical because of withholding treatment in control groups (Marshall & Marshall, 2007). Seto et al. (2008) disagree, stating that for good clinical practice RCT studies within sex offending populations are scientifically and ethically required. This could have implications for treatments offered and the applicability of existing treatment evidence bases i.e. whether the evidence is applicable. This study found the categorization of offender type requires a systematic approach and methodological quality needs to be improved. Many issues present in the studies may be due to lack of reporting important methodological criteria. Guidelines for reporting results of observational studies now recommend reporting effect sizes, power calculations and confidence intervals (McGrath & Meyer, 2006).

Secondly, although theories regarding SA and CCSOs are based on observational studies they suggest that some individuals affected by SA may sexually abuse children as they have limited opportunities and abilities to have their sexual and emotional needs met by appropriate adult partners (Ward, Polaschek & Beech, 2006). However, it is possible that SA may be an etiological factor in offending or a consequence and a maintaining factor of offending. Potential research focusing on lifetime diagnosis or longitudinal research would provide further evidence.

5. Conclusion

The results of this review indicate that research in the area was mainly undertaken prior to

2004, with only two recent studies. The lack of research may be due to the almost exclusive focus on risk within sex offending literature. Given the methodological issues and the potential implications for treatment and risk management, further research would be recommended to examine SA within CCSO. These studies indicate a possible link with SA and CCSO. This association was stronger in individuals diagnosed with paraphilia. Some studies with an experimental approach controlled for confounding factors (e.g. socio economic status, minimal dates, length of incarceration) via control groups or within statistical analysis, finding these variables had a strong association with SA: however it is not clear if they had an impact. This indicates environmental and background variables may play a significant role in SA prevalence in this population. Further research is recommended which focuses on SA, considering clearly defined sex offender groups, experience of emotions and background variables, such as childhood trauma, socio-economic status, to produce greater knowledge of the association and impact of SA within the sex offender population. SA has direct theoretical links to understanding some sex offenders' psychological deficits; this review highlights the importance of assessing for SA, with implications for treatment.

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APPENDIX A.1 Reason for excluded studies

Study	Reason for rejection
Calzada, Brown and Doyle (2011)	Focused on psychiatric symptoms as a predictors of sexual aggression among male college students. However, this study did not include convicted sex offenders.
Gowlyn (1992)	Paraphilia, nonparaphilic sexual addiction and social phobia. However this was a brief review and not specific to sex offenders.
Grant (2005)	Focus of the study was demographic and phenomenological features of exhibitionist males and considering Axis I diagnosis. However, the sample age group was 14-68years.
Hornsveld and Kruyk, (2005)	Focus of personality characteristics and aggression and social competency. However, this study included adolescence 16years to 18years in the sample with adults.
Kafka, and Prentsky (1992):	Focus on nonparaphilic sexual addictions and paraphilia in men. However, this study recruited male respondents to a newspaper advertisement. Only 4 of the sample of 30 had previous convictions for sex behaviors and none had current legal charges for sexual misconduct.
Kafka et al (1994):	Focus on Axis I disorder in paraphilia and paraphilia related disorder, however sample is outpatients and none are defined as convicted sex offenders.
Kafka et al. (1998)	Adult paraphilic offenders. Checklist for DSM-III-R disorders. Did not report social anxiety.
Kafka (2010)	Paraphilic offenders checklist for DSM-IV disorders, not reporting social anxiety.
Krueger, Kaplan, and First (2009)	Study reviews comorbidity with Axis I disorders. However, there is no specific reporting of social anxiety.
Ouimette, Shaw, Drozd and Leader (2000)	The focus of this study consistency of reports of rape behaviors among non-incarcerated men. This study did not include men with a conviction of sexual offences.